
# Issues and Challenges for Federal Geospatial Information

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# Summary

Congress has recognized the challenge of coordinating and sharing geospatial data from the local, county, and state level to the national level, and vice versa. The cost to the federal government of gathering and coordinating geospatial information has also been an ongoing concern. As much as 80% of government information has a geospatial component, according to various sources. The federal government's role has changed from being a primary provider of authoritative geospatial information to coordinating and managing geospatial data and facilitating partnerships. Congress explored issues of cost, duplication of effort, and coordination of geospatial information in hearings during the 108th Congress. However, challenges to coordinating how geospatial data are acquired and used—collecting duplicative data sets, for example—at the local, state, and federal levels, in collaboration with the private sector, are not yet resolved. Two bills introduced in the 112th Congress, H.R. 1620 and H.R. 4322, would address aspects of duplication and coordination of geospatial information.

The federal government has recognized the need to organize and coordinate the collection and management of geospatial data since at least 1990, when the Office of Management and Budget (OMB) revised Circular A-16 to establish the Federal Geographic Data Committee (FGDC) and to promote the coordinated use, sharing, and dissemination of geospatial data nationwide. OMB Circular A-16 also called for development of a national digital spatial information resource to enable the sharing and transfer of spatial data between users and producers, linked by criteria and standards. Executive Order 12906, issued in 1994, strengthened and enhanced Circular A-16, and specified that FGDC shall coordinate development of the National Spatial Data Infrastructure (NSDI). On November 10, 2010, OMB issued supplemental guidance to Circular A-16 that labels geospatial data as a "capital asset," and refers to its acquisition and management in terms analogous to financial assets to be managed as a National Geospatial Data Asset Portfolio. It will likely take some time, and several budget cycles, to track whether agencies are adhering to the "portfolio-centric model" of geospatial data management outlined in the supplemental guidance. The 112th Congress may examine its oversight role in the implementation of OMB Circular A-16, particularly in how federal agencies are coordinating their programs that have geospatial assets.

The high-level leadership and broad membership of the FGDC—10 cabinet-level departments and 9 other federal agencies—highlights the importance of geospatial information to the federal government. Questions remain, however, about how effectively the FGDC is fulfilling its mission. Has this organizational structure worked? Can the federal government account for the costs of acquiring, coordinating, and managing geospatial information? How well is the federal government coordinating with the state and local entities that have an increasing stake in geospatial information? What is the role of the private sector?

State-level geospatial entities, through the National State Geographic Information Council, also embrace the need for better coordination. However, the states are sensitive to possible federal encroachment on their prerogatives to customize NSDI to meet the needs of the states.

In early 2009, several proposals were released calling for efforts to create a national Geospatial Information System (GIS). Language in the proposals attempted to make the case for considering such efforts part of the national investment in critical infrastructure. Congress may consider how a national GIS or geospatial infrastructure would be conceived, perhaps drawing on proposals for these national efforts and how they would be similar to or differ from current efforts.

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# Introduction

Historically, the federal government has been a primary provider of authoritative geospatial information, but some argue that consumer demand for spatial information has triggered a major shift toward local government and commercial providers.[1] The federal government has shifted, with some important exceptions, to consuming rather than providing geospatial information from a variety of sources. As a result, the federal government's role has shifted as well toward coordinating and managing geospatial data and facilitating partnerships among the producers and consumers of geospatial information in government, the private sector, and academia. The challenges to coordinating how geospatial data are acquired and used—collecting duplicative data sets, for example—at the local, state, and federal levels, in collaboration with the private sector, are long-standing and not yet resolved.

In 2003 and 2004 the Subcommittee on Technology, Information Policy, Intergovernmental Relations, and the Census, part of the House Committee on Government Reform, held two hearings on the nation's geospatial information infrastructure. A common theme to both hearings was the challenge of coordinating and sharing geospatial data between the local, county, state, and national levels. Quantifying the cost of geospatial information to the federal government has also been an ongoing concern for Congress. At the hearing in 2003, Representative Adam Putnam stated:

> We need to understand what programs exist across the government, how much we're spending on those programs, where we're spending that money, how efficiently, or perhaps inefficiently, we share data across Federal agency boundaries, how we separate security-sensitive geospatial data from those open for public use, and how we efficiently, or perhaps inefficiently, coordinate with State and local governments and tribes.[2]

The explosion of geospatial data acquired at the local and state levels, for their own purposes and in conjunction with the private sector, underscores the long-recognized need for better coordination between the federal government and local and state authorities. At the same time, coordinating, managing, and facilitating the production and use of geospatial information from different sources, of different quality, and which was collected with specific objectives in mind has been a challenge. The federal government has recognized this challenge since at least 1990, when the Office of Management and Budget (OMB) revised Circular A-16 to establish the Federal Geographic Data Committee (FGDC) and to promote the coordinated use, sharing, and dissemination of geospatial data nationwide.[3]

Executive Order 12906, issued in 1994, was intended to "strengthen and enhance" the general policies in Circular A-16. [4] Executive Order 12906 specified that the FGDC shall coordinate the

[1] The National Geospatial Advisory Committee, *The Changing Geospatial Landscape*, January 2009, p. 9, http://www.fgdc.gov/ngac/NGAC%20Report%20-%20The%20Changing%20Geospatial%20Landscape.pdf. Hereafter referred to as NGAC, *The Changing Geospatial Landscape*, January 2009.

[2] Prepared statement of Rep. Adam Putnam, Chair, U.S. Congress, House Committee on Government Reform, Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, *Geospatial Information: A Progress Report on Improving our Nation's Map-related Data Infrastructure*, 108th Cong., 1st sess., June 10, 2003, H. Hrg. 108-99 (Washington: GPO, 2004).

[3] OMB Circular A-16 was originally issued in 1953; however, its lineage stretches back to the early part of the 20th century, and its focus on coordination and avoiding duplication began in an Executive Order dated August 10, 1906. A 1990 revision expanded the Circular beyond surveying and mapping, its original focus, to include digital data, such as the geospatial data discussed in this report. **Appendix** of this report reproduces Appendix C of Circular A-16, which describes its history and background.

[4] Executive Order 12906, "Coordinating Geographic Data Acquisition and Access: The National Spatial Data

federal government's development of the National Spatial Data Infrastructure (NSDI).[5] Further, EO12906 called for the establishment of a National Geospatial Data Clearinghouse to address data standardization, make geospatial data publically available, and address redundancy and incompatibility of geospatial information. Circular A-16 was itself revised in 2002, adding the Deputy Director of Management at OMB as the vice-chair of the FGDC to serve with the Secretary of the Interior, who chairs the committee.

The high-level leadership and broad membership of the FGDC—10 cabinet-level departments and 9 other federal agencies—highlights the importance of geospatial information to the federal government.[6] In fact, supplemental guidance to Circular A-16, issued by Federal Chief Information Officer Vivek Kundra on November 10, 2010, referred to federal geospatial data as a *capital asset*.[7] Questions remain, however, about how effectively the FGDC is fulfilling its mission. Has this organizational structure worked? Can the federal government account for the costs of acquiring, coordinating, and managing geospatial information? How well is the federal government coordinating with state and local entities that increasingly rely on geospatial information? What is the role of the private sector? In its oversight capacity, the 112th Congress may consider these questions from the viewpoint of reducing duplication and costs to the federal government.

This report discusses issues that may be of interest to Congress—managing, sharing, and coordinating geospatial information—and includes examples of legislation. This report also summarizes a diverse set of recommendations and proposals from different non-governmental organizations for how to improve the coordination and management of geospatial information at the federal and state levels. A separate report, CRS Report R41825, *Geospatial Information and Geographic Information Systems (GIS): An Overview for Congress*, discusses geospatial information and GIS; provides several examples of their use; and describes the FGDC, NSDI, and their various activities and programs. This report is limited to discussions of non-classified geospatial information.

# Issues with Organization and Management, Data Sharing, and Coordination

Producing floodplain maps; conducting the Census; planning ecosystem restoration; and assessing vulnerability and responding to natural hazards such as hurricanes, earthquakes, and tsunamis are examples of how federal agencies use GIS and geospatial information to meet national needs. Some view federal government data as inherently geospatial. According to the Department of the Interior, the amount of government information that has a geospatial component—such as address or other reference to a physical location—is as much as 80%.[8]

Infrastructure," 59 *Federal Register*, April 13, 1994.

[5] The NSDI in its original definition under EO12906 means "a distributed network of geospatial data producers, managers, and users linked electronically."

[6] The FGDC is an interagency committee charged with coordinating development, use, sharing, and dissemination of geospatial data on a national basis. Members include representatives from the Executive Office of the President, and Cabinet-level and independent federal agency representatives. See http://www.fgdc.gov/.

[7] Vivek Kundra, Federal Chief Information Officer, *Geospatial Line of Business OMB Circular A-16 Supplemental Guidance*, Office of Management and Budget, November 10, 2010, http://www.whitehouse.gov/sites/default/files/omb/memoranda/2011/m11-03.pdf.

[8] Cited in U.S. General Accounting Office, *Geographic Information Systems: Challenges to Effective Data Sharing*, GAO-03-874T, June 10, 2003, p. 5. Hereafter referred to as GAO (2003). The *2006 Annual Report* from the Federal

Given the ubiquity of geospatial information throughout the federal government, and despite the long history of efforts to manage and coordinate such data articulated in OMB Circular A-16 and its antecedents (see **Appendix** for a history of Circular A-16 and its federal policy lineage), ongoing challenges to handling federal geospatial information can generally be divided into three overarching questions:

- What is the best way to organize and manage the vast array of geospatial information that is acquired at many levels and that has a variety of potential uses?
- What is the best way to share data, particularly among local, state, and federal stakeholders, each of whom may have a need for the same or similar data?
- What is the best way to coordinate among federal agencies, such as the administration and management by different agencies of all the federal lands in the United States?

## Organization and Management of Geospatial Data

It could be argued that some level of duplication of effort, and of inefficiency in the management and sharing of geospatial information, will always exist across a vast federal bureaucracy in which a majority of government information has some geospatial component. It could also be argued that the size of the federal bureaucracy is only one contributing factor. Surveying and mapping activities themselves are prone to duplication of effort among the different missions and goals of the executive branch.[9]

The need to organize and manage geospatial data among federal agencies and among the federal government, local and state authorities, the private sector, and academia is a recurring theme. It recurs, in part, because it is widely recognized that collecting data multiple times for the same purpose is wasteful and inefficient, yet it continues to occur. Alternatively, geospatial data could be collected once to meet the requirements of several users. For example, geospatial data gathered by a local government could be made useful to the state or federal government if the data meet a set of basic and consistent guidelines and protocols. Organizational structures exist at the federal and state levels to identify and promulgate the efficient sharing, transfer, and use of geospatial information, but arguably they have not fully achieved the goal of seamlessly coordinating disparate types of geospatial data. Ideally, these efforts would produce a national spatial data infrastructure, or NSDI, and that appears to have been the intent of EO12906 and the subsequent revisions to Circular A-16 in 2002.

In one sense, the FGDC exists to foster development and implementation of the NSDI.[10] The NSDI includes the processes and relationships that facilitate data sharing across all levels of government, academia, and the private sector. Ultimately, it is intended to be the base resource and structure among geospatial data providers and users at the national, state, and local level. Yet, some members of the geospatial community have indicated that the past efforts to create a

Geographic Data Committee claims that 80%-90% of government information has a spatial component. (GAO became the Government Accountability Office effective July 7, 2004.)

[9] Recognition of the inherent propensity for duplication of effort arguably was first addressed by an Executive Order issued on August 10, 1906. That order allowed the United States Geographic Board (created by the Executive Order) to review mapping projects to avoid duplication and to facilitate standardized mapping. OMB Circular A-16, Appendix C. (See **Appendix** of this report for the text of Circular A-16, Appendix C.)

[10] Per Executive Order 12906.

national spatial data infrastructure have not met expectations, and have called for a new effort to build a "national GIS" or a "NSDI 2.0." (See section below: "A National GIS?") In addition to promoting the efficiency and interoperability of such a national system, some promote NSDI as "digital infrastructure" on par with other parts of the nation's critical infrastructure—such as roads, pipelines, and telecommunications—and underscore its role in the national economy and in national security.

When Circular A-16 was issued in 1953, it aimed to avoid duplication of effort, and included details about coordinating federal mapping activities.[11] As digital geospatial data became more widespread, revisions to Circular A-16 in 1990 and 2002 extended coordination of federal efforts to include digital data, and broadened the mandate to coordinate federal geospatial activities. These efforts to improve management and coordination continue: on March 3, 2006, OMB issued a memorandum asking selected departments and agencies to each designate a senior agency official to take authority and responsibility for geospatial information issues. The memorandum emphasized that "through further coordination, we will maximize our buying and maintaining of geospatial investments instead of independently investing in potentially duplicative and costly data and capabilities."[12] The March 3, 2006, memorandum identified 15 departments and 12 independent agencies that should designate an official at the Assistant Secretary or equivalent level. Most recently, OMB issued supplementary guidance to Circular A-16 on November 10, 2010 (discussed in the next section).

## Supplemental Guidance to OMB Circular A-16, November 10, 2010

### *Geospatial Data as a Capital Asset*

On November 10, 2010, the Obama Administration issued a memorandum providing supplemental guidance to the implementation of OMB Circular A-16.[13] The supplemental guidance labels geospatial data as a capital asset, and refers to its acquisition and management in terms analogous to financial assets. Specifically, it refers to geospatial information as part of a National Geospatial Data Asset (NGDA) Portfolio.

The supplemental guidance states that federal investments in geospatial data "were largely uncoordinated and often lacked transparency, and sometimes resulted in data deficiencies, lack of standardization, inefficient use of resources, lack of interoperability, or inability to share data."[14] To address those issues, the supplemental guidance sets forth its goal of a portfolio-centric model that "cures the single agency, stovepipe model by applying consistent policy, improved organization, better governance, and understanding of the electorate to deliver outstanding results."[15] The supplemental guidance appears to echo the same concerns regarding management,

[11] Milo Robinson, *A History of Spatial Data Coordination*, Federal Geographic Data Committee, A white paper available via the National Geospatial Advisory Committee, May 2008, http://www.fgdc.gov/ngac/a-history-of-spatial-data-coordination.pdf.

[12] Clay Johnson III, OMB Deputy Director for Management, *Designation of a Senior Agency Official for Geospatial Information*, OMB Memorandum for Heads of Selected Executive Departments and Agencies, March 3, 2006, http://www.whitehouse.gov/sites/default/files/omb/assets/omb/memoranda/fy2006/m06-07.pdf.

[13] Vivek Kundra, Federal Chief Information Officer, *Geospatial Line of Business OMB Circular A-16 Supplemental Guidance*, Office of Management and Budget, November 10, 2010, http://www.whitehouse.gov/sites/default/files/omb/memoranda/2011/m11-03.pdf.

[14] OMB Circular A-16, Supplemental Guidance, p. 5.

[15] OMB Circular A-16, Supplemental Guidance, pp. 3-4.

coordination, and sharing previously identified. However, it casts the solution to these challenges in terms of managing a portfolio of investments, described as "the process of tracking, maintaining, expanding, and aligning assets to address and solve the business needs of an enterprise."[16]

The document notes that a key goal of the portfolio management approach is to enable the FGDC, through its Steering Committee, to make "informed decisions" about short- and long-term priorities for NGDA themes and datasets as well as for "collaboration targets" across agencies for dataset development and funding. The approach to NGDA portfolio management would consist of "[t]he inventory, selection, organization, management, evaluation, monitoring, and setting of Federal geospatial dataset priorities to ensure that NGDA Datasets are available to support the mission needs of the Federal Government and its partners, as determined by Federal agencies and their partners and as recommended to OMB."[17]

It is not clear yet whether this "new" approach to organizing and managing federal geospatial information is significantly different from the current approach. Perhaps a financial asset portfolio management approach could provide a more internally consistent way of identifying, classifying, and managing diverse geospatial assets across multiple departments and agencies. Whether this approach will be put into practice by each individual department and agency, and how consistently the "capital asset" approach will be applied across the federal government, remains to be seen. In the executive branch, OMB is the most likely entity capable of assessing the government-wide implementation of the geospatial-information-as-financial-assets approach. Congress in its oversight capacity could choose to ask whether the approach has been implemented and, if so, whether it produced the desired results.

### *Managing Geospatial Assets Within the Annual Budget Cycle*

The supplemental guidance also lays out a process for managing geospatial assets within the annual budget cycle, calling it an annual investment review process. This process could give the agencies with geospatial assets a potentially more visible role in obtaining funding to acquire and manage geospatial data. The supplemental guidance notes that this process could increase the geospatial community's effectiveness by addressing a "disconnect" between agency Chief Financial Officers and managers responsible for an agency's geospatial assets:

> The players traditionally active in the Federal agency budget formation process, most notably the agency CFO community, rarely have expertise in geospatial management or issues. At the same time, those with significant geospatial expertise rarely have a distinct role in the budget process. The fact that so much Federal geospatial spending is subsumed unidentifiably within other program budgets, and therefore opaque to the CFO community, is one reason for the disconnect.[18]

Whether and how the new guidance will affect FGDC management will likely be borne out in the budget priorities for agencies in the annual budget requests, the level of funding for those priorities through the annual appropriations cycle, and in program implementation. The 112th Congress might compare and contrast the broad portfolio management approach outlined in the supplemental guidance against funding requests by agencies that invest in and manage geospatial information.

[16] OMB Circular A-16, Supplemental Guidance, p.4.

[17] OMB Circular A-16, Supplemental Guidance, p. 12.

[18] Ibid., p. 28.

## Data Sharing Between Local, State, and National Levels

The National Research Council (NRC) has reported that the value of geospatial data is better understood at the county level than it was in the past, especially land parcel, or cadastral, data.[19] The benefits of sharing geospatial data so that what is produced locally can be used for national needs, however, are not as widely acknowledged.[20] In the case of land parcel data specifically, many local governments create data for their own use and do not see how a national effort would bring local benefits. The NRC notes, however, that the need for complete national land parcel data has become urgent particularly for at least one application—emergency response. During the Hurricane Katrina disaster, some critical land parcel data that were needed by emergency responders, public officials, and even insurance companies were not readily available or did not exist.[21] Further, the NRC report asserts that many of the property fraud cases associated with the hurricanes of 2005 were the direct result of poor or nonexistent geospatial data, specifically land parcel data.[22]

## Challenges to Coordinating

Several efforts to coordinate geospatial data among federal agencies have proven difficult to achieve. The National Map is an example of a work-in-progress attempting to integrate data from a variety of sources and produce a product that is widely available and useful to many users.[23] In an example cited by the GAO in its 2003 testimony, the U.S. Forest Service (USFS) tried to create a national-level GIS for the forest ecosystem, but had to reconcile data from a variety of incompatible locally developed systems, which used a variety of standards for each forest and district. Most of the USFS effort went into reconciling the different data sets. Ultimately the USFS had to adopt the lowest-resolution format to maintain full coverage of all the forests, and could not use the higher-resolution local data.[24]

### Floodplain Mapping: An Example of Data Sharing

In one sense, floodplain mapping represents an archetypical example of how GIS and geospatial data can be shared to fulfill national and local needs. In this case, the shared need is for accurate floodplain maps. Floodplain mapping also exemplifies the challenge of collecting and sharing geospatial data of sufficient accuracy to meet the needs of local, state, and federal data users and authorities.

A 2009 report issued by the National Research Council (NRC) observed that high-quality, digital mapping of floodplains using the most accurate elevation data is essential to communicate flood hazards, set flood insurance rates, and regulate development in flood-prone areas. Between 2003 and 2008, the Federal Emergency Management Agency (FEMA) invested approximately $1 billion in the Map Modernization Program, a large-scale effort to collect new elevation data, update existing data, and digitize older paper flood maps. State governments and local partners also contributed considerable funding to the effort. The FEMA effort produced digital flood maps covering 92% of the nation's population; however, according to the NRC report only 21% of the population has flood maps that fully meet FEMA's own data quality standards. As a result, insurance companies, lenders,

[19] For more information about land parcel data, see CRS Report R40717, *Issues Regarding a National Land Parcel Database*, by Peter Folger.

[20] National Research Council, *National Land Parcel Data: A Vision for the Future*, Washington, DC, 2007, p. 2. Hereafter referred to as NRC, National Land Parcel Data.

[21] NRC, National Land Parcel Data.

[22] NRC, National Land Parcel Data, p. 7.

[23] The National Map would be the next generation of topographic maps—online and interactive—that would supplant the paper versions that the USGS has produced for decades. The National Map is envisioned as a consistent framework for geographic knowledge nationwide. For more information, see CRS Report R41825, *Geospatial Information and Geographic Information Systems (GIS): An Overview for Congress.*

[24] GAO (2003), p. 6.

realtors, and property owners who depend on the flood maps to determine flood insurance needs, plan for development, and prepare for floods still have to deal with uncertainties inherent in the less accurate flood maps.

A fundamental requirement for accurate flood maps is accurate elevation data, which are used to draw the boundaries for the 1-in-100 chance annual flood hazard (sometimes referred to as the 100-year flood). Part of the challenge of producing high quality digital floodplain maps is that there is no single nationwide set of elevation data of sufficient resolution and accuracy to make floodplain maps that meet FEMA requirements. The USGS National Elevation Dataset is a primary data source that FEMA uses to produce flood maps, but it has a level of uncertainty about 10 times larger than FEMA defines as acceptable for floodplain mapping, according to NRC. The USGS National Elevation Dataset does include some high-resolution, more accurate elevation data, but most of the USGS dataset is of poorer resolution.

Alternate sources of more accurate elevation data exist, but are not available nationwide. One of these sources is provided using LIDAR (an acronym for Light Detection and Ranging), which can be used to collect high-resolution elevation data. For example, North Carolina instigated a state-wide LIDAR program, in part, to improve the accuracy of floodplain maps in the wake of Hurricane Floyd in 1999. As a result, the state has nearly complete LIDAR coverage. And, floodplain maps for nearly all the counties in North Carolina meet or exceed national flood hazard data quality thresholds. Because of this data gap at the national level, the 2009 NRC report recommends that FEMA should increase its collaboration with federal, state, and local government agencies to acquire high-resolution and accurate elevation data across the nation.

**Sources**: National Research Council, *Mapping the Zone: Improving Flood Map Accuracy*, Washington, DC, 2009, Summary; Recommendations; p. 38; and CRS Report R41056, *Mandatory Flood Insurance Purchase in Remapped Residual Risk Areas Behind Levees*, by Rawle O. King.

The National Integrated Land System (NILS) is another example of an ongoing effort to coordinate and integrate disparate federal land data among several agencies. The federal government owns approximately 650 million acres, about 29% of all land in the United States. The Bureau of Land Management (BLM) is the designated custodian for federal land parcel information and ownership status.[25] Three federal agencies in addition to the BLM administer most federal lands: the USFS, Fish and Wildlife Service, and the National Park Service.[26] In an effort to develop a single representation of federal lands, the BLM and USFS launched NILS, billed as a partnership among the federal agencies and states, counties, and private industry, to provide a single solution to managing federal land parcel information in a GIS environment. A limited amount of federal land data is available through NILS, which is currently in a project or prototype phase, and the project makes current information and tools available through its GeoCommunicator component.[27]

Both The National Map and NILS represent federal efforts to foster interagency sharing of data into a single product providing national coverage of topography and federal land holdings respectively. The utility of both efforts is limited by the quality, accuracy, and completeness of the underlying geospatial data. The National Map, as currently envisioned, will provide topographic information at the 1:24,000 scale, meaning that roughly one inch on the map equals 2,000 feet. That scale will likely limit The National Map's usefulness for depicting, for example, floodplain boundaries to meet the requirements for FEMA floodplain maps.[28] Also, at some point in the future NILS presumably could provide one-stop shopping for an accurate assessment of the

[25] Circular A-16, at http://www.whitehouse.gov/omb/circulars/a016/a016_rev.html.

[26] The Department of Defense also administers a significant amount of land.

[27] See http://www.geocommunicator.gov/GeoComm/index.shtm.

[28] One report notes that the USGS National Elevation Dataset (NED) is commonly used in flood map production, even though the uncertainties inherent in the elevation data are about 10 times greater than those defined by FEMA as acceptable for flood plain mapping. See National Research Council, *Mapping the Zone: Improving Flood Map Accuracy*, Washington, DC, 2009, p. 3.

amount of federal land currently administered by each land management agency in the Department of the Interior and for the USFS. Currently, however, the best method for obtaining an accurate tally of federal lands is to contact each land management agency directly for their most up-to-date data.[29] (Even then, data from individual agencies do not always sum to totals reported by the General Services Administration.)[30]

Both NILS and The National Map are test cases for whether and how the agencies implement the OMB-issued supplemental guidance (discussed above) for managing geospatial assets as a portfolio of investments. For example, under the new guidance presumably both projects would receive some indication of where they stand in comparison to other geospatial dataset priorities. Further, it would be expected that under the new OMB guidance those priorities would be reflected in annual budget requests from the relevant agencies, which OMB would review and approve prior to their submission to Congress.

# Legislation in the 112th Congress

## H.R. 1620/S. 1153, the Federal Land Asset Inventory Reform Act

One bill introduced in the 112th Congress on March 15, 2011, attempts to address some of the challenges to data coordination discussed above. The Federal Land Asset Inventory Reform Act of 2011 (H.R. 1620) would establish a national cadastre.[31] The legislation has been referred to the Subcommittee on Energy and Mineral Resources, House Natural Resources Committee, but has not been acted upon. A companion bill, S. 1153, was introduced on June 7, 2011, in the Senate and referred to the Senate Energy and Natural Resources Committee. It also has not been acted upon.

H.R. 1620 would require the Secretary of the Interior to develop a multipurpose cadastre of federal "real property." The legislation defines cadastre as an inventory, and defines federal "real property" as land, buildings, crops, forests, or other resources still attached to or within the land or improvements or fixtures permanently attached to the land or structures on it. The bill would require the Secretary to coordinate with the FGDC pursuant to OMB Circular A-16, to integrate the activities under the legislation with similar cadastral activities of state and local governments, and to participate in establishing standards and protocols that are necessary to ensure interoperability of the geospatial information of the cadastre for all users.[32]

Supporters of the legislation claim that a national cadastre would improve federal land management, resource conservation, environmental protection, and the use of federal real property. As noted above, the BLM currently has responsibility for maintaining federal land parcel information and ownership status, and it is not clear if H.R. 1620 would expand the current geospatial activities at BLM, shift the custodial responsibilities to another agency, or result in a different approach or program. Beginning with versions of these bills first introduced in the 110th Congress, supporters indicated that existing inventories of federal real property are old, outdated, and inaccurate, and updates to these inventories could improve management of the federal

[29] E-mail from John P. Donnelly, National Atlas of the United States, USGS, Reston, VA, February 4, 2009.

[30] General Services Administration, *FY 2009 Federal Real Property Statistics*, Published by the GSA Office of Governmentwide Policy, 2009, http://www.gsa.gov/graphics/ogp/FY2009_FRPR_Statistics.pdf.

[31] A cadastre is a map or database of ownership and boundaries of land parcels.

[32] Similar legislation (H.R. 1520) was introduced in the 111th Congress but was not enacted. In the 110th Congress, H.R. 5532 and S. 3043 were introduced but neither version of the bill saw action.

lands.[33] Observers also noted that the federal government lacks one central inventory that coordinates all the inventories into one usable database.[34]

## H.R. 4233, The Map It Once, Use It Many Times Act

On March 21, 2012, Representative Lamborn introduced H.R. 4233, the Map It Once, Use It Many Times Act. In Title I, the bill would establish a National Geospatial Technology Administration in the Department of the Interior (DOI) that would create a National Geospatial Database of all U.S.-owned or -managed lands, Indian trust lands, and nonfederal lands. Funding for the database would be at the discretion of the administrator, who would develop and implement a funding strategy using appropriated funds, user fees, a revolving fund, partnerships with other government agencies, public-private partnerships, or some combination of some or all of the funding options.

The administrator of the new organization would assume all geospatial functions currently vested by law in the DOI, the National Forest System within the U.S. Department of Agriculture, and NOAA, including all functions of the National Geodetic Survey.[35] All federal agencies would make their geospatial data available for inclusion in the National Geospatial Database, and the database would be available to the public.[36] Further, Section 108(a)(3) of the bill would require that the Director of the Bureau of the Census make available, for inclusion in the database, all building addresses and geographical coordinates collected by the Census Bureau.[37] Currently the Census Bureau is forbidden to publish any private information—such as names, addresses, and telephone numbers.[38] (Privacy issues are discussed below under the section entitled "Some Privacy Issues: Census, Farm Bill, Internet.")

H.R. 4233 would also create a National Geospatial Policy Commission. The commission would produce a National Geospatial Data Plan, and the National Geospatial Technology Administration would be required to carry out the recommendations in the plan. The commission would be charged with coordinating federal agencies, state and local governments, and private entities to "eliminate redundancy in the performance of geospatial activities."[39] The bill also calls on the commission to direct geospatial activities to private-sector firms when possible.

Two of the five titles in H.R. 4233 deal with moving geospatial activities to private-sector firms and encouraging federal use of private geospatial firms generally.[40] Title III lays out requirements for contractor performance of geospatial activities, and Title IV calls for developing a strategy to encourage and enhance the use of private geospatial firms by federal agencies and by other organizations that receive federal funds. Title V of the bill contains provisions for encouraging geospatial research and development.

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[33] "Legislators return with FLAIR," *GEO World*, May 2008, p. 15.

[34] Ibid.

[35] The National Geodetic Survey mission is "to define, maintain and provide access to the National Spatial Reference System to meet our nation's economic, social, and environmental needs." See http://www.ngs.noaa.gov/INFO/WhatWeDo.shtml.

[36] Except for information that could cause damage to U.S. national security, per §103 (C)(2) of the bill.

[37] That section of the bill also states that these data would be provided for the National Geospatial Database "to the extent consistent with individual privacy protections."

[38] 13 U.S.C. §9 and §214. See also U.S. Census Bureau, at http://www.census.gov/privacy/data_protection/federal_law.html.

[39] Title II, §201(2) of H.R. 4233.

[40] Titles III and IV of H.R. 4233.

# Legislation in the 111th Congress

## The Ocean and Coastal Mapping Integration Act

The Ocean and Coastal Mapping Integration Act, introduced as S. 174 and H.R. 365 in the 111th Congress, was enacted into law as Subtitle B of Title XII of the Omnibus Public Land Management Act of 2009 (P.L. 111-11). The act established a federal program to develop a coordinated and comprehensive mapping plan for the coastal waters including the exclusive economic zone and continental shelf, and the Great Lakes. Programs established by the act are intended to address issues of data sharing and cost-effectiveness by fostering cooperative mapping efforts, developing appropriate data standards, and facilitating the interoperability of data systems. Further, the program established under the act would develop these standards to be consistent with the requirements of the FGDC, so that the data collected in support of mapping are useful not only to the federal government, but also to coastal states and other entities. The theme of coordinating activities is underscored in several places in the act, specifically with other federal efforts such as the Digital Coast,[41] Geospatial One-Stop,[42] and the FGDC, as well as international mapping activities, coastal state activities, user groups, and nongovernmental entities.

Subtitle B of Title XII of P.L. 111-11 called for a plan for an integrated ocean and coastal mapping initiative within NOAA. The agency submitted the plan to Congress on May 24, 2010.[43] A biennial progress report on implementing the subtitle, also called for in P.L. 111-11, from the Interagency Committee on Ocean and Coastal Mapping is undergoing interagency review and is not available.[44]

The challenge to collect and manage the geospatial data needed to meet the requirements of the act is daunting, given the array of federal agencies, affected states, local communities, businesses, and other stakeholders who have an interest in coastal mapping. Moreover, the stakeholders require wide and disparate types of data—such as living and nonliving coastal and marine resources, coastal ecosystems, sensitive habitats, submerged cultural resources, undersea cables, aquaculture projects, offshore energy projects, and others. Congress could view the development of the ocean and coastal mapping plan and its implementation as a test case: how to manage a large data collection effort—cost-effectively and cooperatively—that reaches across all levels of government and includes interest groups, businesses, NGOs, and even international partners.

# Nonfederal Stakeholders

Nonfederal organizations and institutions have increasingly participated with federal agencies in communicating their concerns regarding geospatial information management, data sharing, and coordination. The National Geospatial Advisory Committee directly advises the FGDC. The

[41] The Digital Coast is a NOAA-led effort envisioned as a an information delivery system for coastal data, as well as the training, tools, and examples needed to turn data into useful information. See http://www.csc.noaa.gov/digitalcoast/index.html.

[42] Geospatial One-Stop is the means of accessing metadata resources published through the National Spatial Data Clearinghouse and managed in NSDI.

[43] E-mail from Michael Jarvis, Congressional Affairs Specialist, NOAA, May 17, 2011. The report is available at http://www.iocm.noaa.gov/reports/2010_NOAA_OCMIA_Report_to_Congress.pdf.

[44] E-mail from Michael Jarvis, May 17, 2011.

National States Geographic Information Council and private sector geospatial organizations, such as the Management Association for Private Photogrammetric Surveyors, provide views of state geospatial organizations and the private sector respectively.

## National Geospatial Advisory Committee

The National Geospatial Advisory Committee (NGAC) was formed in early 2008 to provide advice and recommendations to the FGDC on management of federal geospatial programs, development of the NSDI, and implementation of the OMB Circular A-16. The committee members represent the private sector, nonprofits, academia, and governmental agencies.[45] As part of its charter, NGAC provides a forum to convey views representative of nonfederal stakeholders in the geospatial community.

In its January 2009 report, *The Changing Geospatial Landscape*, NGAC noted that as geospatial data production has shifted from the federal government to the private sector and state and local governments, new partnerships for data sharing and coordination are needed. Specifically:

> the hodgepodge of existing data sharing agreements are stifling productivity and are a serious impediment to use even in times of emergency.... When the federal government was the primary data provider, regulations required data to be placed in the public domain. This policy jump-started a new marketplace and led to the adoptions of GIS capabilities across public and commercial sectors. However, these arrangements are very different when data assets are controlled by private companies or local governments.[46]

NGAC observed further that the federal government's need for land parcel (cadastral) data, which is also emphasized by the National Research Council, is missing an arrangement for acquiring the detailed property-related data necessary to make decisions during times of emergency. The report suggests that detailed land parcel data—their use, value, and ownership—are needed by FEMA, the USFS, and the U.S. Department of Housing and Urban Development for emergency preparedness, response to hurricanes and wildfires, or to monitor the current foreclosure problems.[47]

### NGAC Recommendations to the Obama Administration

In October 2008, NGAC sent recommendations to the 2008-2009 Presidential Transition Team for improving the federal role in coordinating geospatial activities, for making changes to the *U.S. Code* pertaining to non-sensitive address data, and for enhancing geospatial workforce education.[48] Most recommendations pertained to how the federal government could better coordinate geospatial partnerships with state, local, and tribal governments; the private sector; and the academic community. Recommendations included:

- establish a geospatial leadership and coordination function immediately within the Executive Office of the President; the geospatial coordination function should be included in the reauthorization of the E-Government Act;

[45] National Geospatial Advisory Committee membership, http://www.fgdc.gov/ngac/membership. The committee is sponsored by the Department of the Interior under the Federal Advisory Committee Act.

[46] NGAC, *The Changing Geospatial Landscape*, January 2009, p. 12.

[47] Ibid.

[48] See http://www.fgdc.gov/ngac/ngac-transition-recommendations-10-16-08.pdf.

- require OMB and FGDC to strengthen their enforcement of OMB Circular A-16 and EO 12906;
- establish/designate Geographic Information Officers with each department or agency with responsibilities stipulated within OMB Circular A-16;
- establish and oversee an Urgent Path[49] forward for implementation of geospatial programs necessary to support current national priorities and essential government services underpinning the NSDI; and
- continue NGAC.

Arguably, the supplemental guidance to OMB Circular A-16, issued on November 10, 2010, and the appointment of Vivek Kundra as the Federal Chief Information Officer at OMB address aspects of the first two bullets. OMB's memorandum issued on March 3, 2006, arguably should have addressed the third bullet; however, NGAC apparently felt that OMB's guidance had not been implemented. Of the final two bullets, NGAC has continued to exist, and it is not clear what progress has been made in implementing NGAC's Urgent Path forward (one aspect of the Urgent Path, Imagery for the Nation, is discussed below).

## National States Geographic Information Council (NSGIC)

At the national level, the FGDC exists to promote the coordinated development, use, sharing, and dissemination of geospatial data. At the state level, NSGIC[50] exists to promote the coordination of statewide geospatial activities in all states, and to advocate for the states in national geospatial policy initiatives to help enable the NSDI.[51] NSGIC ties its activities to the NSDI by promoting the development of Statewide Spatial Data Infrastructures (SSDI), under a partnership called the 50-States Initiative, which is intended to lead to the creation of an SSDI for each state. In this vision, each state's SSDI would enable coordination between geospatial data producers and consumers at all levels within the state, and allow the state to share geospatial data with the national geospatial structure envisioned as the NSDI. The emphasis on organization and coordination of geospatial data and activities is seen as critical to reducing costs to states and the federal government by eliminating data redundancy—collecting the data once, using it many times—and by setting standards that allow different users to share geospatial data regardless of who collects it.

NSGIC identified 10 criteria that define a "model" state program necessary to develop effectively coordinated statewide GIS activities, and thus reduce inefficiency and waste. These include:

1. strategic and business plans;
2. a full-time, paid, GIS coordinator and staff;
3. clearly defined authority and responsibility for coordination;
4. a relationship with the state chief information officer;
5. a political or executive champion for coordinating GIS;
6. a tie to the national spatial data infrastructure and clearinghouse programs;

[49] The NGAC recommendations further specify that an "Urgent Path" forward should include (1) Imagery for the Nation; (2) National Land Imaging Program; and (3) National Land Parcel data.

[50] Members of NSGIC include senior state GIS managers and coordinators, although other members include representatives from federal agencies, local government, the private sector, academia, and other professional organizations. See http://www.nsgic.org/about/index.cfm.

[51] National States Geographic Information Council Strategic Plan 2009-2011, at http://www.nsgic.org/resources/strategicplan.pdf.

7. the ability to work with local governments, academia, and the private sector;
8. sustainable funding, especially for producing geospatial data;
9. the authority for the GIS coordinator to enter into contracts; and
10. the federal government working through the statewide coordinating body.

Not all states have fully embraced the need for statewide coordination of GIS activities, and states differ in their structure and organization of geospatial data among and between state, county, and local entities. For example, some states such as Arkansas share geospatial data across agencies in a very open manner; other states such as New York require more formal agreements or have restrictions to sharing data that include critical infrastructure. Nonetheless, some level of data sharing does occur, even in the more restrictive states.[52]

## Imagery for the Nation—A Priority for NSGIC

A priority for NSGIC is a program under development, called Imagery for the Nation (IFTN), that would collect and disseminate aerial and satellite imagery in the form of digital orthoimagery.[53] In its description of the program, NISGIC notes that digital orthoimagery is the foundation for most public and private GIS endeavors. Further, NSGIC states that as many as 1,300 different government entities across the nation are developing digital orthoimagery products, "leading to higher costs, varying quality, duplication of effort, and a patchwork of products."[54] IFTN represents an effort to establish one coherent set of geospatial data—arguably one of the most important layers in a GIS, orthoimagery—that is organized for the benefit of many stakeholders at the federal, tribal, regional, state, and local levels.

As proposed, IFTN would involve two federal programs: (1) the existing National Agricultural Imagery Program (NAIP) administered by the U.S. Department of Agriculture, and (2) a companion program administered by the USGS. The NAIP imagery would be enhanced to provide annually updated one-meter resolution orthoimagery over all states except Hawaii and Alaska.[55] The USGS program would also collect one-foot resolution imagery every three years for 50% of the U.S. land mass (except Alaska, which would get one-foot resolution imagery only over densely populated areas). The program would include an option for states to "buy up," or enhance, any or all of the remaining 50%. The program would also provide 50% matching funds for partnerships to acquire six-inch resolution imagery over urban areas with at least 1,000 people per square mile as identified by the U.S. Census Bureau.

NSGIC states that statewide GIS coordination councils would specify their requirements through business plans, and that all the data would remain in the public domain, which would address many of the data sharing issues discussed above. In addition, the program calls for appropriate national standards for all data, which is a goal of the FGDC, a partner to NSGIC in the development of IFTN. NSGIC estimates that the program would cost $1.38 billion during the first 10 years, and argues that this would save $120 million over the 10-year period by reducing the

[52] E-mail from Learon Dalby, NSGIC President 2008-2009, March 11, 2009.

[53] Orthoimagery is an aerial or satellite image or photograph from which distortions resulting from camera tilt and ground relief have been removed. An orthophoto or orthoimage has a uniform scale and can be used as a map.

[54] See NISGIC, Imagery for the Nation, at http://www.nsgic.org/hottopics/iftn_brochure_0308.pdf.

[55] Imagery would be updated once every three years in Hawaii. The USGS program would produce one-meter imagery for Alaska once every five years.

number of contracts, contracting for larger areas, reducing overhead, and reducing other costs associated with current efforts.[56]

### Advancing the National Spatial Data Infrastructure: The NSGIC Perspective

NSGIC considers the 50-States Initiative as one of the crucial components needed to build the NSDI and to bring consistency of geospatial information and parity to each of the states.[57] NSGIC also considers that IFTN is the first of several initiatives creating "core data layers," or baseline data programs, required to meet federal, state, and local needs.[58] NSGIC suggests that the NGAC be an interim step in the governance structure for NSDI, and indicates that the national effort to govern and coordinate the geospatial enterprise should not stifle the states from customizing aspects of the NSDI to suit their own needs:

> the federal government must not dictate the actions of state and local governments, nor should state governments dictate those of local government. However, each level of government can exert a strong influence on subordinate levels by making funding contingent on compliance with the policies and standards it establishes.[59]

NSGIC further argues that federal funding for the NSDI could be modeled on the federal highway program, similarly contingent upon compliance with collaboratively established criteria and requirements.[60]

## Some Privacy Issues: Census, Farm Bill, Internet

### The Census and the Farm Bill

The Census Bureau is forbidden to publish any private information—such as names, addresses, and telephone numbers.[61] This type of geospatial information is available in the public domain for some localities[62] in the United States; however, it is not provided by the Census Bureau. In its recommendations, NGAC calls for revising "restrictive statutory language as it pertains to non-sensitive address data in Title 13 U.S. Code and to 'geospatial' data in Section 1619 of the 2008 farm bill."[63] Title 13 contains provisions for not disclosing or publishing private information that identifies an individual or business (Sections 9 and 214). A proposal to amend portions of Title 13 and make geospatial data collected by the Census Bureau more accessible will likely raise issues about the privacy of personal data collected by the federal government; the value of such data for emergency management; disaster preparation; other local, regional, and national needs; and the

[56] CRS did not review the basis for NSGIC's cost analysis, nor examine the cost benefit analysis completed for the IFTN in July 2007.

[57] NSGIC, A Strategic Framework for the National Spatial Data Infrastructure, http://www.nsgic.org/resources/strategic_framework_NSDI_NSGIC.pdf.

[58] Ibid; for example, NSGIC suggests that Imagery for the Nation should probably be followed by Elevation for the Nation, Transportation for the Nation, Cadastral for the Nation, and so on.

[59] NSGIC, The States' Perspective on Advancing the National Spatial Data Infrastructure, October 10, 2008.

[60] NSGIC, A Strategic Framework for the National Spatial Data Infrastructure, p. 19.

[61] 13 U.S.C. §9 and §214. See also U.S. Census Bureau, at http://www.census.gov/privacy/data_protection/federal_law.html.

[62] For example, the website for the City of Greeley, CO, property information map, identifies names and addresses, the underlying street map and orthoimagery, together with other information such as school districts and even the nearest fire hydrant. See http://gis.greeleygov.com/origin/propinfo.html.

[63] In Title 13 Congress delegates responsibility for conducting the Census to the Secretary of Commerce.

various tradeoffs between privacy concerns and the accessibility to geospatial data. As discussed above, legislation introduced in the 112th Congress—H.R. 4233—contains provisions to make geospatial Census data publicly available, notwithstanding Title 13 of the *U.S. Code*.

Section 1619 of the 2008 farm bill (P.L. 110-246) prohibits disclosure of geospatial information about agricultural land or operations, when the information is provided by an agricultural producer or owner of agricultural land and maintained by the Secretary of Agriculture. Certain exceptions, contained in Section 1619 of the 2008 farm bill, apply to the prohibition. NGAC has taken the position that the statutory language could be revised to enhance the value of the geospatial data while not compromising privacy.[64]

## Internet Privacy

Concerns about access to geospatial information arose following the release of a draft Federal Trade Commission (FTC) report on Internet privacy.[65] The report focused on "behavioral advertising," whereby advertisements are tailored to web users based on data collected about them across the web. The report proposed that Internet companies create a "do-not-track" mechanism that would allow Internet users to opt out of online data collection.[66] Although the thrust of the report was not focused on geospatial information, some private-sector interests raised concerns about how access to geospatial information might be affected under a "do-not-track" mechanism. The Management Association for Private Photogrammetric Surveyors (MAPPS), an association of private geospatial firms,[67] expressed its concern with the term "precise geolocation data," which MAPPS noted was undefined in the FTC report. In a letter to the FTC, MAPPS wrote: "The use of the term 'geolocation' or other geospatial relevant terminology, as it is used in this or possible future FTC regulation, could thwart legitimate and desirable business activities; deny consumers the products, technologies and services they are demanding in the marketplace; and impose a significant new liability on our members."[68] In its letter, MAPPS requested that the FTC either remove any reference to the term "precise geolocation data," define the term, or exempt firms from having to obtain consent from consumers before collecting the geospatial data. MAPPS added that "it would be impractical, if not impossible, for our member firms to obtain prior approval or consent from individual citizens prior to acquiring or applying data such as satellite imagery, aerial photography, or parcel, address, or transportation data."[69]

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[64] Telephone conversation with Anne Miglarese, Chair, National Geospatial Advisory Committee, May 26, 2009.

[65] Federal Trade Commission, *Protecting Consumer Privacy in an Era of Rapid Change: A Proposed Framework for Businesses and Policy Makers*, Preliminary FTC Staff Report, Washington, DC, December 2010, http://www.ftc.gov/os/2010/12/101201privacyreport.pdf.

[66] See Wendy Davis, "FTC Criticizes Self-Regulatory Efforts, Proposes Blanket Do-Not-Track," *MediaPostNews, Online Media Daily*, December 1, 2010, http://www.mediapost.com/publications/?fa=Articles.showArticle&art_aid=140435.

[67] The Executive Director for MAPPS, John M. Palatiello, has served on NGAC.

[68] Letter to the Honorable Jonathan D. "Jon" Liebowitz, Chairman, Federal Trade Commission, from John M. Palatiello, Executive Director, The Management Association for Private Photogrammetric Surveyors, January 4, 2011, http://www.mapps.org/issues/MAPPS_Letter_to_FTC_1-4-11.pdf. The FGDC Secretariat also commented on the preliminary report, echoing MAPPS' concerns about the term "precise geolocation data." See http://www.ftc.gov/os/comments/privacyreportframework/00354-57961.pdf.

[69] MAPPS letter to the FTC.

On March 26, 2012, FTC issued the final report.[70] The report included a footnote that provided some clarification over the issue of collecting geolocation data for the purposes of mapping: "With respect to use of geolocation data for mapping, surveying, or similar purposes, if the data cannot reasonably be linked to a specific consumer, computer, or device, a company collecting or using the data would not need to provide a consumer choice mechanism."[71] Although the footnote seems to address the issue raised by MAPPS (as discussed above), its interpretation likely hinges on how the term "reasonably" is applied.

# A National GIS?

In early 2009, several proposals were released calling for efforts to create a national GIS,[72] or for renewed investment in the national spatial data infrastructure, or even to create a "NSDI 2.0."[73] The language in the proposals attempted to make the case for considering such investments part of the national investment in critical infrastructure, both by directly supporting these national GIS and geospatial efforts, but also via secondary effects. For example, one proposal indicated that organizations rebuilding roads, bridges, and schools need updated online information networks "to rebuild in a smart, efficient, environmentally conscious and sustainable way."[74] Another proposal touted a national GIS as a tool to speed economic recovery, which could also "leave the country with a public utility, a modern geospatial information system, that itself can become a foundation for new generations of industries and technologies in the future."[75]

Their call for efforts to build a "national" GIS, or a new version of the NSDI, or for an investment in a national spatial data infrastructure, raises questions about the current efforts to build the NSDI. Efforts to construct the NSDI began in 1994 with Executive Order 12906, or even earlier when OMB revised Circular A-16 in 1990 to establish the Federal Geographic Data Committee. The recent proposals imply that efforts which began 20 years ago and continue today are not sufficiently national in scope, planning, coordination, sharing, or implementation, despite the existence of the FGDC, NSGIC, or other entities such as the Coalition of Geospatial Organizations or MAPPS that are forums for organizations concerned with national geospatial issues.

[70] Federal Trade Commission, *Protecting Consumer Privacy in an Era of Rapid Change: Recommendations for Businesses and Policymakers*, March 2012. Available at http://ftc.gov/opa/2012/03/privacyframework.shtm.

[71] FTC, *Protecting Consumer Privacy in an Era of Rapid Change*, footnote 187, p. 39.

[72] These proposals are broader than what is currently envisioned as The National Map, under the USGS.

[73] See, for example, the following: *A Proposal for National Economic Recovery: An Investment in Geospatial Information Infrastructure Building a National GIS*, at http://www.gis.com/gisnation/pdfs/national_economic_recovery.pdf; *A Proposal for Reinvigorating the National Economy Through Investment in the US National Spatial Data Infrastructure*, at http://www.cast.uark.edu/nsdi/nsdiplan.pdf; and *A Concept for American Recovery and Reinvestment, NSDI 2.0: Powering our National Economy, Renewing our Infrastructure, and Protecting our Environment*, at http://www.nsdi2.net/NSDI2ProposalForAmericanRecoveryAndReinvestment_V1_4.pdf.

[74] A Concept for American Recovery and Reinvestment, NSDI 2.0: Powering our National Economy, Renewing our Infrastructure, and Protecting our Environment, p. 2.

[75] *A Proposal for National Economic Recovery: An Investment in Geospatial Information Infrastructure Building a National GIS.*

# Conclusion

Congress may consider how a national GIS or geospatial infrastructure would be conceived, perhaps drawing on proposals for these national efforts as described above, and how they would be similar to or differ from current efforts. Congress may also examine its oversight role in the implementation of OMB Circular A-16, particularly in how federal agencies are coordinating their programs that have geospatial components. In 2004, GAO acknowledged that the federal government, through the FGDC and Geospatial One-Stop project, had taken actions to coordinate the government's geospatial investments, but that those efforts had not been fully successful in eliminating redundancies among agencies. As a result, federal agencies were acquiring and maintaining potentially duplicative data sets and systems.[76] Since then, it is not clear whether federal agencies are successfully coordinating among themselves and measurably eliminating unnecessary duplication of effort.

Were Congress to take a more active oversight role overseeing the federal geospatial enterprise, it could evaluate whether specific recommendations from nonfederal stakeholders have been addressed. For example, the National Geospatial Advisory Committee recommended that OMB and FGDC strengthen their enforcement of Circular A-16 and Executive Order 12906. However, enforcement alone may not be sufficient to meet the current challenges of management, coordination, and data sharing. The issuance of supplemental guidance to Circular A-16 by OMB in November 2010 may instigate new activity among and between agencies, which could spill over into better coordination with the state and local governments and the private sector. It will likely take some time, and several budget cycles, to track whether agencies are adhering to the "portfolio-centric model" of geospatial data management outlined in the supplemental guidance. It may also take time to evaluate whether the "portfolio-centric model" is the best available model for managing the federal geospatial assets.

[76] GAO (2004), p. 19.

# Appendix. History and Background of Circular A-16[77]

This Circular was originally issued in 1953, revised in 1967, and revised again in 1990. The Bureau of the Budget (now the OMB) issued Circular No. A-16 on January 16, 1953. Appended to this Circular were Exhibits, occasionally revised, that dealt with procedures for programming and coordinating of federal Topographic Mapping Activities, National Atlas, Geodetic Control Surveys and International Boundaries.

The purpose of the 1953 Circular was "to insure (sic) that surveying and mapping activities may be directed toward meeting the needs of federal and state agencies and the general public, and will be performed expeditiously, without duplication of effort." The original Circular references Executive Order No. 9094, dated March 10, 1942. This Executive Order directs the Director of the Bureau of the Budget to coordinate and promote the improvement of surveying and mapping activities of the Government. Furthermore, it passes on functions carried out by the Federal Board of Surveys and Maps, established by Executive Order No. 3206, dated December 30, 1919. Thus, the OMB is directed to make recommendations to agencies and to the President regarding the coordination of all governmental map making and surveying. Executive Order No. 3206 superseded an Executive Order, dated August 10, 1906, that granted advisory power to the United States Geographic Board to review mapping projects to avoid duplication and to facilitate standardized mapping.

A revised Circular A-16 was issued on May 6, 1967. The most significant change in this revision is the addition of a new section on Responsibility for Coordination. This section outlines the responsibilities of three federal departments (Department of the Interior (DOI), Department of Commerce (DOC) and Department of State (DOS)). Both the original and the 1967 revision of the Circular focus on providing a guide for the development of annual programs of the individual agencies and, through the Exhibits, established extensive reporting requirements.

A second revised Circular A-16 was issued on October 19, 1990. This revision expanded the Circular to include not only surveying and mapping, but also the related spatial data activities. Specifically, it included geographically referenced computer-readable (digital) data. In addition, the Exhibits are no longer referenced and a short reporting requirements section is added.

The 2002 updated Circular calls for continued improvements in spatial data coordination and the use of geographical data. Objectives for this revision are to reflect the changes that have taken place in geographic information management and technology, and to clearly define agency and FGDC responsibilities. The proposed revision displays an integrated infrastructure system approach to support multiple government services and electronic government.

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[77] Circular A-16 Revised, White House Office of Management and Budget, Appendix C. Reproduced here in its entirety.

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